and so remained until 4h. 10m. 50s., when a cloud obscured the image and prevented further observation. The times were carefully determined by comparison with the noon signal on the Navy Department building which can be seen from the Weather Bureau building.

As the diameter of Mercury during its transit in 1894 was about 10 seconds, and as no spot was seen by Mr. Dean on February 3, 1898, we must infer that the small moon required by Waltemath's theory does not exist.

Dr. Waltemath states that:

One hundred and six anomalistic rotations of the new satellite are almost exactly equal to the 35-year period in climatic changes established by Professor Bruckner, and that, therefore, the existence of this satellite may have an especial interest to meteorologists.

On this point the Editor must differ with him inasmuch as we can not see any reason why either the small hypothetical or the large and actual satellite of the earth should have any appreciable influence, at the present time, upon our meteorology.

RECENT EARTHQUAKES.

December 29, 6h 32m 43s a. m., Port au Prince, Hayti, W. I. Prof. T. Scherer reports as follows:

A severe earthquake was experienced at Port au Prince lasting one minute and thirty-one seconds. The following are the conclusions to be drawn from the curves traced by the Secchi seismograph at the meteorological observatory of the College of St. Martial.

The entire phenomenon consisted of five consecutive shocks, the total duration of which was forty-eight seconds, and of a series of feeble movements very perceptible to an attentive observer. The first shock lasted eight seconds, it began from east-northeast and ended from west-southwest. The vertical component was quite strong at about the fifth second. The movement immediately began with more force in the horizontal direction and less in the vertical; this lasted eleven seconds, and the direction from which it came was more toward the east. The third shock lasted three seconds, and was characterized by a very regular oscillatory movement. The fifth shock was the strongest, lasted ten seconds, began from the northeast, and died away in the southwest, with a vertical component that was scarcely appreciable. All the other movements, after the forty-eighth second, were feeble, with the same horizontal direction. During all this time the seismic pendulum described ellipses in the sand whose major axes varied from northeast through the south to southwest. The Bertelli microseismometer was for a long time agitated and finally maintained a north-south direction.

The same earthquake was felt in the neighborhood of Port au Prince and with the same features. It seems to have been very violent in the interior of the island of Dominica.

January 1, 5:15 a. m., Peachland, Cal., earthquake, vibration east and west; duration, 2 to 3 seconds.

11th, Lakeside, Wash., slight shocks of earthquake.

13th, Laramie, Wyo., slight shock of earthquake about midnight, duration about fifteen seconds.

14th, Lakeside, Wash., slight shocks of earthquake.

15th, Lakeside, Wash., slight shocks of earthquake.

26th, Helena, Ark., 7:35 p. m., slight earthquake, no serious damage.

Prof. Edward W. Morley, of Adelbert College, Cleveland, Ohio, and Prof. C. F. Martin, of the Weather Bureau at Washington, report that no earthquakes disturbed their respective seismographs during January.

THUNDERSTORMS IN CALIFORNIA.

Mr. Barwick has called the attention of the Editor to an article on the above subject that had been overlooked by him in preparing his notes for the MONTHLY WEATHER REVIEW for December, 1897, page 539. This article is by Mr. John D. Parker, and calls attention to the infrequency of thunderstorms in southern California. (See the American Meteorological Journal, June, 1895, Vol. XII, page 51.) Among other things, Mr. Parker says:

The Weather Bureau has reported only two electrical storms at San Diego during the past sixteen years. One of these occurred on August 27, 1894, and it may be taken as a type of all the electrical storms in this region. On that day there prevailed a close, sultry atmosphere, with a stoppage of the sea breeze, replaced by fitful currents of hot air from the desert, and a filmy vapor cast a slight veil over the face of the sun. About midday the observer at San Diego, from the roof of his building, saw far to the south fifteen or twenty very small thunderheads, appearing conical above, with flat bases. These thunderheads moved slowly northward along the San Jacinto mountain range, and arrived opposite San Diego about sunset, where, by the enlargement of the visual angle, they seemed to fill the whole heavens with black masses of cloud. The edge of this Sonora brushed by San Diego that evening, with an electrical display which was quite vivid in the mountains.

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Lightning sometimes plays a little among the clouds far out over the ocean, and occasionally thunder mutters in the mountains, but the Weather Bureau reports that during the last sixteen years not a single thunderstorm arising from general cyclonic action has occurred at San Diego. The thunderstorms of this region are Sonoras, that move northward two or three times a year from Sonora and contiguous regions, where they originate. They seem to be formed, like ordinary thunderstorms, from vapors evaporated from the Gulf of California and regions lying adjacent, and, moving northward along the San Jacinto Range on both sides of the mountains, exhibit electrical displays until their forces are exhausted and they are dissipated.

The explanatory hypotheses suggested by Mr. Parker in the rest of his article are suggestive and interesting, but need a further elaboration before arriving at a satisfactory solution of the problem.

SNOW ROLLERS.

Mr. T. B. Jennings, section director, in his report of the Kansas section for January, says:

A decidedly unusual phenomenon occurred in Saline County during the snowstorm on the 14th, which would indicate that the conditions which produce hailstorms in warm weather may prevail in cold weather, the temperature for the day ranging between 34° and 25°. Over a narrow belt about 12 miles long, extending from southeast of Bavaria to north of the Saline River, late that evening, a fall of snowballs occurred, ranging "from the size of baseballs to half-bushel measures." They do not seem to have been hard, yet they were still to be seen scattered about the fields by persons who went out the next Sunday, the 16th, to view them.

As freshly fallen snow is often rolled into balls and cylinders by a gentle wind, we presume that the balls in Saline County may have been a case of "snow rollers."

BRIGHT METEORS.

Notices in the daily press have been published with regard to a bright meteor observed at 1 p. m. at San Jose, Cal., by Mr. Paddington of the Lick Observatory. It was seen in the west at an elevation of about 8° above the horizon, moving rapidly toward the north in a path slightly inclined toward the earth. It increased in brightness along its course and disappeared suddenly in a clear sky.

Reports of a great meteor seen at Dubois, near Boise City, Idaho, about January 25, have been received, but no reliable details are given.

NOTES FROM THE REPORTS OF STATE SECTIONS.

MONTANA.

Mr. Walter A. Clark, of Choteau, Mont., proposes to experiment with the box kite for carrying up the cold wave, or norther, flag signal.

The Secretary of Agriculture has directed that the voluntary observers and the Climate and Crop correspondents of the Weather Bureau, be included among those to receive the seeds gratuitously distributed by the Department.

Mr. Coe, of Kipp, Mont., says: "Probably there is no locality in the Western States where the chinook phenomena are so prettily illustrated

as at this station. Lying due west is an extensive ravine about 30 miles long, reaching from the foothills to the summit of the main range of the Continental Divide. Within the confines of this great canyon are three lakes, varying in length from 1 to 3 miles in extent, the upper lake being about 1,000 feet above the lower. When a chinook is blowing, a billowy mass of vapor hangs over the upper lake like a great mass of cotton, white, unchanged in form, unvarying in shade, for hours at a time. It is a very beautiful spectacle and is known as the "white flag of the chinook."

NEVADA.

Mr. Charles G. Fogg, of Silver Peak, Nev., reports "On the 29th, Pogonip all over the valley."

In general, the Section Director, Mr. R. F. Young, notes that an area of high pressure, clear, cold, dry air, with light winds from the north, prevailed throughout the month, with more frost than usual. These are the conditions that favor the Pogonip, which is a mist of ice crystals or frozen fog and very injurious to the health of men and animals. Some remarks on the Pogonip will be found in the MONTHLY WEATHER REVIEW for February, 1894, Vol. XXII, page 77. We should be glad to publish a special study of the Pogonip in any one of the valleys of Nevada.

ARKANSAS.

The detailed report of the Fort Smith tornado and that of the Crawford County tornado will be found in the January report of the Arkansas Section.

NEW ENGLAND.

A detailed account of the snowstorm and resulting damage in New England on the 25–26th and on the 31st will be found in the report of the New England Section. The blizzard of January 31–February 1 was comparable with that of March, 1888, and December, 1872, and January, 1867.

MARYLAND.

The report of the Maryland and Delaware Section gives an account of the establishment of twenty special stations by the Maryland State Weather Service, which is now enabled to take up profitable lines of research bearing upon the physiography, climatology, hydrography, forestry, and crops of that State. The work will be done in cooperation with the United States Geological Survey and the various bureaus and divisions of the United States Department of Agriculture. The problems to be first taken in hand will be "The influence of Chesapeake Bay and of the mountains of Washington County upon the crops in their respective vicinities. Four series of three special stations each will be established, reaching from the water's edge of Chesapeake Bay inland, and the twelve stations will represent the soils devoted to garden truck, wheat, corn, and fruit. Eight or more stations will also be established in Washington County at different elevations upon the mountain slopes, representing the upper and lower limits of successful cultivation of peaches. Observations of the temperature and moisture of the soil will be made in addition to the meteorological observations."

One can but hope that important economical results will flow from this notable effort on the part of Professor Clark and the State legislature to thus extend the work of the State service from the mere field of observation over into the field of agricultural investigation. Studies of a general character in this matter of the relations between climate and crops have been taken up by isolated agricultural experiment stations, and pretty much all that was known on the subject ten years ago was collected by the Editor in his report of June 30, 1891. The present investigation by Professor Clark is undoubtedly the most extensive that has yet been undertaken by any State or Government.

TENNESSEE.

In the report of the Tennessee section Mr. H. C. Bate, section director, states that he has on hand a number of the earlier copies of these reports and other publications which will enable him to supply missing numbers to those who desire to complete their sets. We are sure that many students of climatology, in foreign countries as well as in the United States, will gladly avail themselves of this offer.

SPECIAL SNOWFALL BULLETINS.

A year ago Mr. Brandenburg, director of the Colorado State section of the Climate and Crop Service, initiated a system of special reports on the snowfall, which was found very useful in forecasting the quantity of water that became available for irrigation when the snow melted. We take pleasure in noting the fact that Mr. Blythe, in charge of the Arizona section, has published a similar special snow bulletin for that State. At the close of January there was more snow than usual still remaining on the ground at many stations, while others reported that, although the snow had disappeared, yet the ground was thoroughly soaked, and the cold weather had caused the retention of an unusual quantity of water in the soil, so that, on the whole, there was a good prospect of an abundance of water for agricultural purposes.

THE ALMANACS AND THE WEATHER BUREAU.

During the past few months the Editor has noticed a number of newspaper paragraphs discussing the relative merits of the weather predictions published daily by the officials of the Weather Bureau for one or two days in advance, and those published by the numerous "farmers' almanacs," published several months, or even a year, in advance, and sold in large numbers throughout the country. The predictions of the weather, as made by the Weather Bureau, are based entirely upon the daily maps that show the actual condition of the atmosphere, as reported by reliable observers throughout the country. On the other hand, the predictions in the various almanacs are founded upon a variety of principles among which are the following:

1. The most conservative and rational almanacs are those that compile from the records of many past years a table showing what sort of weather has prevailed most frequently on the respective days of the year.

2. The least rational almanacs are those that pretend that the weather is controlled by planetary combinations and stellar influences, therefore, such predictions are properly said to be based upon astrology.

3. An intermediate class publishes predictions based upon the probability of spots on the sun, thereby assuming it to have been demonstrated that the solar spots control terrestrial weather.

4. The least scientific system of preparing the almanac predictions was explained to the Editor many years ago by a gentleman whose almanac made the greatest pretentions to high scientific accuracy. This gentleman stated that on certain days he felt endowed with a certain ability or inspiration. These were his weather making days, on which he sat down, and with the most absolute confidence in the accuracy of his work, wrote up the weather for the coming year, continuing at the work for a considerable time until the inspiration seemed to leave him, whereupon he necessarily stopped and delayed resuming the work until again filled with the spirit of divination.

Doubtless some almanac makers adopt a combination of the four preceding methods but, in general, these seem to be the principles most widely recognized in the long-range predictions of the almanacs, except only that in all cases the authors make free use of a system of general and rather indefinite terms that will apply just as well to a thunderstorm, a hurricane, or an earthquake. The warning "look out for something very unusual about this time" is, of course, no